Report from the Status and Trends Working Group

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EXECUTIVE SUMMARY

The Status working group (WG) summarized available information on the regional and local status of Caribbean Acroporids and discussed whether these species warranted further listing under the Endangered Species Act (ESA). They estimated 60-75% of the entire population has been examined (or at least observed) and concluded enough information was available to make a determination whether these species were threatened or endangered. The WG also estimated 5% (no more than 10%) of the population resides within US waters. The WG developed specific products including a "*Status Matrix*" and "*Status Map*" that included data on the distribution, status and threats to these species and a *Cross shelf matrix* to allow for a more comparable assessment of Acroporid populations. They identified several gaps in geographical information and prioritized areas to be assessed including Bahamas (especially southern), Nicaragua, Pedro Banks, northern Cuba, Haiti, Banks off of Turks and Caicos, Saba Banks, eastern Caribbean, and Trinidad and Tobago. The WG suggested that a combination of several population parameters be considered when assessing the status of Acroporid populations (e.g., abundance, partial mortality, size structure, survivorship, genetics) and recommended areas requiring additional research.

The WG agreed there has been a significant decline in Acroporid populations and discussed specific examples (Florida, Jamaica, Belize, Curacao, USVI) where greater than 80% loss (and up to 98%) occurred. The WG established the 1970s as a baseline for "stable, healthy" populations and the 1980s as a baseline of the regional decline. They noted additional shifting baselines were useful to understand local and current declines. The WG agreed it was both the overall reduction of populations throughout its historic range and fast rate of decline that makes these species vulnerable to extinction. They did not believe the geographical range (on ecological scale) had been contracted, although local range reductions had occurred. The WG identified and discussed various sources of mortality and agreed WBD had been the primary cause of decline, but current impacts were harder to determine.

The WG agreed there has been an overall decline over the last 10 years in *A. palmata*, with only small recovery trends. Over the last year (2001), several *A. palmata* populations are believed to be stable, but highly vulnerable to disturbance and further decline. The status of *A. cervicornis* has been a continuing decline with no or few signs of recovery over the last year or 10 years. Threats to both species remain high and since populations are subjected to numerous different stresses, any one severe disturbance event (or synergistic events) could lead to local extirpations and one or both species may be vulnerable to possible extinction.

The WG emphasized a key factor in recovering these species was to develop and implement actions that minimize further disturbance and increase population sizes. The WG concluded that *Acropora palmata* and *A. cervicornis* warranted further listing under the Endangered Species Act (ESA) and would benefit from the protection the ESA affords.

OVERVIEW

The goal of the Status working group (WG) was to begin to summarize available information on the status of Caribbean Acroporids at both regional and local scales and discuss those factors important in determining whether these species are threatened or endangered. They focused on five areas: 1) minimum and maximum population estimates; 2) trends; 3) historic and current range; 4) population parameters; and 5) recovery. As a first step, they discussed if there was enough information currently available to make the determination that these species were threatened or endangered. They estimated that over 60-75% of reefs in the Greater Caribbean has been assessed or monitored (within the last five years) with some type of survey. They suggested there may be some important populations in the 25-40% not yet observed (e.g., Cuba, Bahamas, Saba) important to the persistence of these species. They further estimated that at least 5% (and probably no more than 10%) of the entire Greater Caribbean population resides within US waters, and at least 80% of the reefs within US waters have been examined scientifically. Despite the information gaps, the WG agreed that sufficient information existed to make the determination whether these species are threatened or endangered.

1. Minimum and Maximum Population Estimates

A. Historical distribution and abundance

The WG discussed the historic distribution of Acroporids and how *A. palmata* and *A. cervicornis* were once dominant species commonly found throughout the greater Caribbean. They agreed that currently, northern-most *A. palmata* populations extended from southern Florida and the northern Bahamas (Abaco) region to their southern-most populations near Trinidad & Tobago (unlikely further south than this)-and the insular and coastal reefs of Venezuela and Colombia. Populations extended to their westernmost range in Veracruz Mexico to their easternmost point in Barbados. In the U.S., the WG noted the current northern-most limit for *Acropora palmata* was in Broward County, FL and the species was unlikely to occur in Palm Beach County. Given the coldwater temperatures (14-15 degrees in many winters) in the Flower Garden banks, the WG agreed it did not occur there. *Acropora cervicornis*, they noted, has a similar range except its northern limit was Palm Beach. The WG suggested efforts be made to confirm the current distribution of these species, especially northern and southern most occurrences.

To synthesize information on the status of Acroporids, particularly at specific locations throughout its range, the WG developed a "*Status Matrix*" (Table 1&2) and "*Status Map*" (Fig. 1) that included data on the distribution, status, and threats to these species. Distribution information included location of reef, extent of distribution, and reef type. Status data included recent trends, baseline used to determine status source of information, extent of decline, condition, coral cover, and sexual recruits. The level of threat was categorized into evidence of human impact, bleaching, hurricanes, disease, and damselfish, snail or other predation. Data was documented from source of information, data parameters measured, other surveys available, and gaps in information. Priorities for information needs were also listed. Members from the WG were able to provide preliminary information on Florida Keys and BNP, US Virgin Islands, St. Thomas, St. Croix, St. John, Puerto Rico, Dominican Republic, Cuba, Trinidad, Colombia, San Andres, Colombia (including San Andres), Gonaive Island, Jamaica, and Pedro Bank. The *Status Matrix* was formatted into a questionnaire and given to other workshop participants who were able to provide additional information on Belize, Netherlands Antilles (Aruba, Curacao, Bonaire), Tobago, Anguilla, British Virgin Islands, Broward County Florida, and Venezuela (Los Roques). The WG recommended the *Status Matrix* questionnaire be distributed to other experts in the region (e.g., through coral list server).

B. Habitat

The working group discussed general habitat requirements of Acroporids and factors that limited the distribution of both species. The WG also discussed the extent of different habitats occupied by these corals over the range of the species. They agreed that population densities of these species (particularly *A. palmata*) varied greatly throughout its region, and in addition, population abundances ranged from single, isolated individuals to large densely aggregated, monospecific thickets. The WG recognized the need for a more specific definition of a distinct population in order to compare the status of different areas, particularly without the current availability of information on genetically distinct populations. Therefore, the WG suggested a standardized classification scheme for Acroporid reef types (=population) and developed a draft *Cross shelf matri*x (similar to Lindeman et. al, 1998). The matrix included information they had available on the location of Acroporid reefs (e.g., country, latitude/longitude), cross shelf position of reef [innershelf=first emergent barrier or reef crest, midshelf=Reef crest, outer shelf (to ~30m), offshore (atolls and offshore)]; water depth, reef position or aspect (e.g., leeward, windward), and wave energy. The WG recommended the draft matrix be sent to other Acroporid experts throughout the region for completion. This would allow for a more comparable assessment of Acroporid reef types (=populations) throughout the region (i.e., comparing apples to apples) and the magnitude of a declining population in one area versus another area could be assessed in relation to the status of the species throughout its range.

Resolution: ***Once dominant species on shallow reefs (0-15 m depth) throughout the greater Caribbean, Acroporid abundance has been drastically reduced in abundance and spatial dispersion. In many areas, previously densely populated subpopulations (or monospecific thickets) now consist of no or few individuals (e.g., Los Roques Venezuela). Present and future likelihood of disturbance to their abundance and habitat remains high due to both natural and anthropogenic factors.***

2. Trends

A. Initial and shifting baselines

To determine extent and rate of decline of these species, the WG discussed how to establish a baseline for comparison purposes. For Caribbean Acroporids, the WG agreed there was at least 20 years of comparable information on these species, as well as geological data, and thus suggested the 1970s as a regional baseline (e.g., several workshop participants have personal observations of Acroporid populations from at least the 1970s). The WG believed the 1970 baseline represented the status of Acroporid populations in a "healthy, stable" state, and prior to any significant disturbance events, particularly the dramatic Acroporid die off due to white-band disease in the 1980s. The WG also believed the 1970s baseline and its representativeness of a "stable, healthy" population was further supported by presentations by Aronson and Hubbard that showed the geological record suggested that in the last ~10,000 years such population declines as the one related to the 1980s die off were at least rare and/or uncommon in the last 3000 years, thus suggesting that such die offs are unique or unprecedented.

In addition to the 1970s representing a "healthy" baseline, shifting baselines in relation to significant disturbance events were discussed due to their relevance in estimating the continuing decline of these species. The WG suggested there were two regional "disturbance baselines"; the first in the 1980s coinciding with the outbreak of white-band disease and *Diadema* die off and the second coinciding with high Acroporid mortality related to the 1998 coral bleaching event. On smaller scales, the WG suggested this baseline varied in relation to localized disturbance event(s) that may have had more significant impacts

than regional disturbance events. For example, in the Virgin Islands, reoccurring and intense hurricanes have caused some of the most significant declines or alterations in Acroporid populations, and more so than the 1998 bleaching event.

Resolution: ***The status of Acroporids has changed significantly since the 1970s with a region wide decline occurring in the 1980s and subsequent declines during the 1990s. The 1970s represents a baseline for "stable, healthy" populations and the 1980s as a baseline of the regional decline primarily resulting from white-band disease. Additional shifting baselines are useful to understand local and current declines; for example, mortality from disease has been compounded on local populations by hurricanes, bleaching events, and outbreaks of predators.***

B. Extent of loss

To understand the overall loss of Acroporids, the WG examined both the extent and the rate of decline. Acroporid populations throughout the Caribbean declined dramatically in the 1970s-1980s and continued to decline in the 1990s until many populations were nearly gone. The extent of decline, including both a significant reduction (loss of 80-90%) in the abundance of individuals and an extreme reduction in area of distribution throughout its range, triggered the initial concern for the persistence of this species. Examples of widespread decline, where there was a loss of greater than 80% of population (and up to 98% in some areas) for both species included Florida, Jamaica, Belize, Curacao, and USVI. Because the number of individuals had declined to significantly low levels in such a fast timeframe (~10 years), the WG agreed it was both the overall reduction of populations throughout its historic range and fast rate of decline that makes these species vulnerable to extinction.

The WG discussed the current status (as compared to the importance of historic status) of several local populations and identified (where known) which populations were increasing, decreasing, stable, or unknown. Over the last 10 years (decadal scale), they suggested the overall trend of *A. palmata* has been a decline with small recovery trends. Over the last year (2001), several populations are believed to be stable, albeit at such low population densities that there is high enough vulnerability to stochastic disturbance to cause extinction. There is some evidence of recovery, as well as evidence of areas just recently examined (e.g., southcoast Cuba) that contain stable populations. The WG emphasized the status of many populations are unknown and may still be declining. For *A. cervicornis*, there has been a continual decline since the 1980's with no signs of recovery, although Broward county was noted as an exception. It is not known whether or not the few remaining populations are able to persist. For both species the degree of threat remains high. The WG noted that more information was needed especially in light of its uncertainty as a genetically distinct species. The matrix provides additional information on the status and stability of local populations.

Resolution: ***Acropora palmata and A. cervicornis have experienced an unprecedented decline throughout their historic range since the 1980s, including both a significant reduction (loss of 80-98%) in the number of individuals and an extreme reduction in area of distribution. Neither species have recovered to their former abundance. Some local A. palmata populations have been stable over the last year with evidence of recovery and limited sexual recruitment (e.g., USVI). Acropora cervicornis experienced a more severe decline with no or few signs of recovery or sexual recruitment (except Broward County, FL). Acroporids have a high likelihood of localized extirpation and possible extinction on ecological time scales (10-100 yrs).***

C. Sources of mortality

The WG discussed various sources of mortality and identified historic and current threats, as well as the degree of threat, for each country in the *Status Matrix*. The WG agreed that white-band disease (WBD) was the primary cause for the region wide decline of Acroporids, but current impacts are harder to determine. The working group also emphasized that many current factors causing mortality or stress were highly localized, including breakage by hurricanes/storms, temperature extremes (bleaching, cold-air outbreaks), disease, predation by invertebrates and fishes, algae overgrowth, and long-term exposure resulting from drops in sea level. Similarly, human impacts resulting in mortality or stress such as direct destruction by ship groundings/anchoring, dredging, and diving/snorkeling; nutrient loading often leading to macroalgal overgrowth; and reduced water clarity due to sedimentation, were also localized.

The WG suggested the sources of mortality or threats varied on both spatial and temporal scales and identified on the *Status Matrix* which locations had high, medium or low threats. They concluded that the information compiled in the *Status Matrix* suggested that current threats to Acroporids are very high for both anthropogenic effects and natural disturbances. They recommend that in order to assist resource managers, more data were needed on these threats, particularly synergistic effects from confounding disturbances, but more importantly, management actions were needed to alleviate or minimize further disturbance. It was emphasized that even Acroporid populations within marine reserves were still declining and remain at high risk.

The WG noted that certain locations appeared to be more severely affected by coral disease, although they did not know if there were any specific patterns for the Caribbean. For example, several Acroporid populations in Puerto Rico (e.g., Culebra) had more than 50% of colonies infected with WBD. These colonies subsequently died and became completely covered by algae and colonized by damselfish within two months. Acroporid reefs off of Key West were reported to have the highest incidence of WBD in the Florida Keys. In contrast, several *A. palmata* populations on Andros Island Bahamas and along the south coast of Cuba had less evidence of mortality from WBD. The WG discussed that the infectious nature of disease is unclear, particular how it relates to population abundance. It was not known if densely aggregated thickets were more susceptible to mortality than populations further distances apart or isolated individuals.

Mortality caused by snails was suggested by the WG as an additional and important concern, mainly because the incidence of mortality seemed to be increasing, although highly localized. Even though more studies today are focusing on snail-induced mortality, the WG noted the extent and rate of mortality caused by these snails, especially in comparison to other predators, was alarming. Damselfish predation was also suggested as an area of further investigation, particularly following coral mortality either from disease or bleaching.

Resolution: ***White-band disease (WBD) is believed to be the primary cause for the region wide Acroporid decline during the 1980s. Current factors causing mortality or stress are highly localized, with some areas showing greater susceptibility to disease (e.g., Florida Keys, Belize), predation (e.g., Florida Keys), and storms (e.g., US Virgin Islands). Given the declined state of Acroporids and the increase in the frequency and intensity of disturbances, these sensitive species are highly vulnerable to both natural and anthropogenic stressors, especially synergistic disturbances.***

D. Information gaps

The WG listed areas where little or no information was available or where the information was not readily available and recommended these as priorities for status surveys. These areas included (but not limited to, nor are they in any priority order): Haiti, Saba, Saba Bank, Nicaragua, Mushwar Bank and Silver Bank, Turks and Caicos (some AGRRA data), Pedro Banks, Serranilla Bank, Alicia Bank, Bajo Nuevo Bank, Bahamas (Aklins, Ragged Islands, Crooked Island, Long Island, Cat Island, southern Bahamas), Inagua, Meguana and Hawk's Die Reef (Bahamas); northern Bahama Bank; from N. Eleuthra to New Providence, Treasure Key, Grand Bahama, Mysteriosa Banks, Swan Islands, Rosa Linda Bank, Bay Islands, Costa Rica, and eastern Caribbean (although most islands have some ongoing monitoring programs such as St. Vincent, Barbados, St. Lucia and Martinique, and Guadeloupe).

Resolution: ***An estimated 60-75% of the entire Acroporid population has been examined and enough information is available to make a determination whether these species are threatened or endangered. Approximately 5%, and no more than 10% of the population resides within US waters. Several geographical areas where more information is needed include Bahamas (especially southern), Nicaragua, Pedro Banks, northern Cuba, Haiti, banks off of Turks and Caicos, Saba Banks, eastern Caribbean, and Trinidad and Tobago.***

3. Historic and Current Range

The WG discussed what portion of the historical range or distribution of the species had been lost and suggested that it was likely the overall range had remained the same since at least a few individuals were still present throughout its range. The WG emphasized that local reductions in range have occurred in several areas throughout the Caribbean. In addition some populations, especially those located at the extent of their range, may not be viable or able to persist given the severe reduction in abundance. The challenge in defining distinct populations, especially genetically distinct ones, made it difficult for the WG to conclude with certainty that there was no contraction of its geographical range or to determine if populations have been extirpated on smaller spatial scales. They did note examples from the literature and personal communications where populations at some study sites have been reported extirpated (e.g., southern Belize). The WG discussed how the *A. cervicornis* population in Broward County did not "exist" in the 1970s and suggested more information was needed on whether this species expanded its range or increased its population size. The WG did not know which was more important for the recovery of this species either maintaining the overall range extent or maintaining local viable populations and ensuring these do not go extinct.

Resolution: ***The historic range of Acroporids is believed to be the same as the current range, although it is not possible to conclude with certainty given the current scientific inability to differentiate genetically distinct populations. Local range reductions and extirpations have occurred and it is believed some populations may be reproductively isolated. Given the extent of decline and vulnerability to extirpation, it is believed these corals remain threatened throughout their range.***

4. Population Parameters

The WG discussed which population parameters were needed and available to help understand the status and trends of Acroporids, particularly in trying to quantify loss. The WG focused on factors that were available to help understand the population status at larger spatial scales since the Biology WG was

discussing such life history parameters as survivorship, reproduction, and genetic information. The Status WG suggested that a combination of several parameters (and not just one single factor) be considered when assessing the status of Acroporid populations including amount of coral cover (both living and dead), number of individual colonies, colony size, percent coral mortality (both old and recent), proportion of living colonies versus standing dead colonies, reef structure (or complexity/vertical height), area cover/extent, areas with "luxuriant or healthy" populations, and areas with extirpated populations.

The WG mentioned that size related parameters and partial mortality data were needed since these corals were modular organisms. Besides a noticeable reduction in population sizes, reports (e.g., USVI) suggest individual colonies were smaller and often had partial mortality. The WG noted that percent live coral cover is how coral status has been historically assessed, but suggested there can be two contexts of coverage; one that describes how Acroporids occupy a certain range of reef area (areal extent), and second the density of individuals in a population. In addition, they emphasized the need to identify end member reefs (i.e., those that are the most degraded vs. those relatively pristine) as a way to characterize the viability of populations and potential for recovery (i.e., identify those reefs that are potential "re-seeders") and identified those they knew of in the Status matrix. They suggested a vertical index (e.g., colony heights, canopy complexity) needed to be characterized and its role in the population stability needed to be evaluated. The WG discussed that examining standing dead colonies in growth position, as is done in the AGRRA survey method, gives an indication of the historic population (where preserved) and importance as habitat to other reefal organisms. The degree of coral cover, colony density, and relief may also be good indicators of the suitability of an area to support recruitment.

The working group suggested directions for future research should address understanding these population parameters, particularly at larger spatial scales. They noted that more information was available for *A. palmata* than *A. cervicornis*, and emphasized that more information was needed for *A. cervicornis* especially since it has suffered the most dramatic decline. The WG recognized various population parameters have been measured by different surveyors (and methods), often making it difficult to compare data sets. They identified a few good standardized comparable data sets existed on a large scale (e.g., AGRRA, Caricomp), as well several local monitoring programs. The WG group did not have time to discuss the spawning, long distant dispersal, distribution of populations and proximity to each other, minimum population size, recruitment, or survivorship, but noted more information was also needed in these areas.

The WG agreed that there was not enough information on the genetic status of Acroporids to determine an effective population size. They emphasized it was important to understand if colonies were genetically different for Acroporids more so than for many other species due to their tendency for asexual reproduction. The WG suggested Acroporids may be at higher genetic "risk" than other species, therefore underscoring its endangerment status. Several research efforts are addressing the genetic question, but it was also recognized that there needed to be other measurable criteria (e.g., populations parameters discussed above) in lieu of these data until they become available.

On the last workshop day, the Status and Biology working groups (WGs) met and discussed Acroporid reproduction strategies and survival of recruits. The WGs agreed that both sexual and asexual recruitment appear to be highly localized. It was suggested that on local scales, populations can resist/recover if densities are high enough through both sexual and asexual reproduction, but as population size decreases, they rely more on sexual reproduction, which could be a limiting factor or problem for the many severely reduced populations. The WG did not know if Acroporids were less dependent upon sexual reproduction

than other species, or if they were just unsuccessful at sexual reproduction. In addition, they questioned if sexual recruitment was more successful on live *Acropora* stands or areas with more standing dead colonies. The Broward county thickets of *Acropora* showed evidence that sexual recruitment can be very successful, although most recruitment studies have shown low recruits or a reduction in the number of recruits in recent years. In general though, the WG agreed that sexual recruitment rates were very low, yet it was not known how dependent local populations were on sexual recruitment. Since it is likely that some areas rely on sexual recruitment more than others, the WG suggested these areas should be identified. The WG said not enough information was known to estimate what percentage of a population was needed to reproduce sexually in order to support the entire population through sexual recruitment alone.

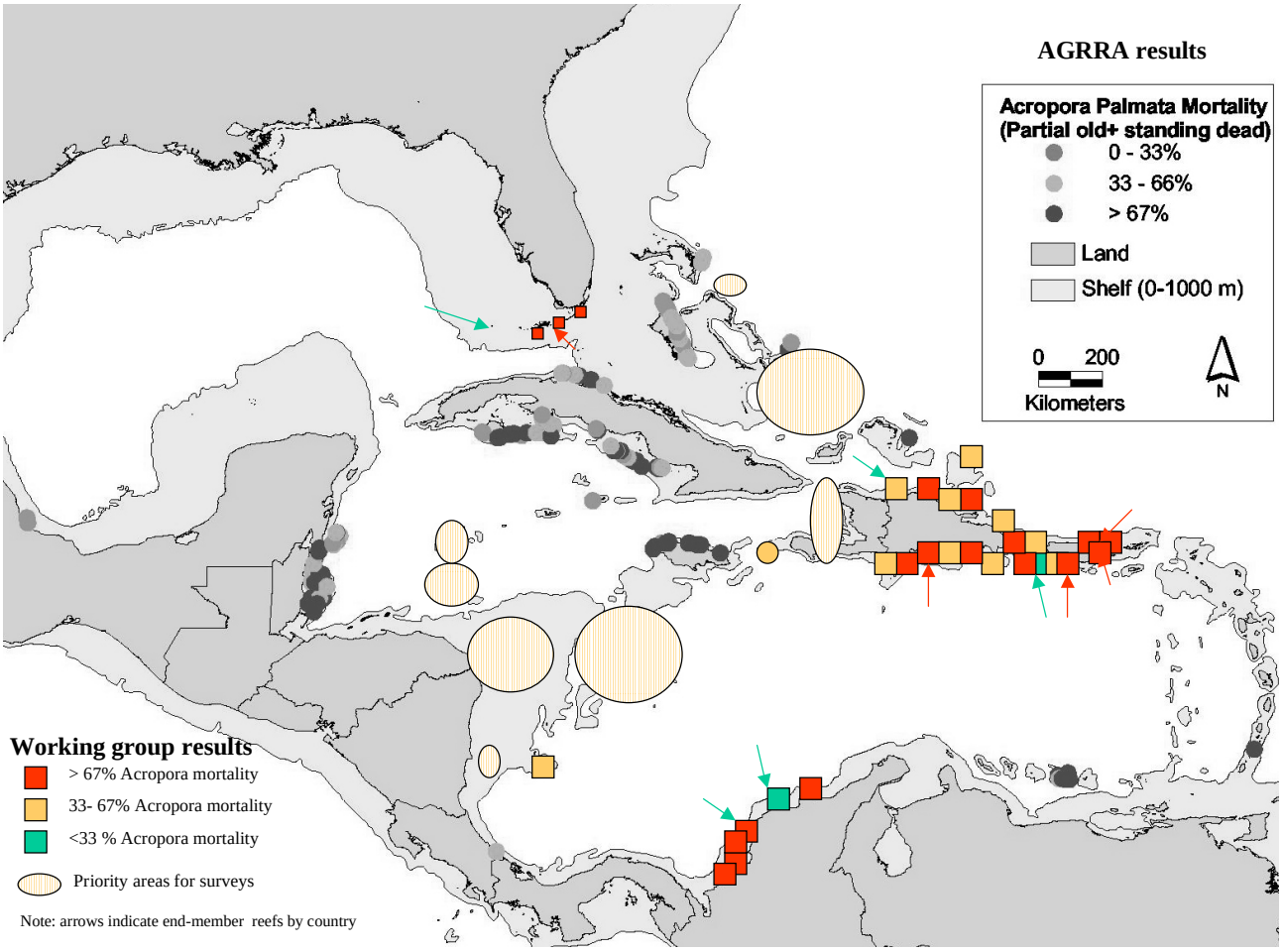
The WG also considered the difference in investment strategies between asexual vs. sexual reproduction. Data from the 1970s in the Keys showed that for a series of years *Acropora* did not show signs in their tissue of sexual reproduction, yet colonies were very abundant. Thus it was postulated that perhaps in the past, they only sexually reproduced every few years suggesting a lower investment in this life history strategy. It was emphasized that asexual recruitment was not equivalent to sexual recruitment in outcomes and consequences since the effects on the population as a whole are very different. The survivorship of juvenile corals was not known, although the WG suggested that survivorship is likely low, particularly of *A. cervicornis*. The WG suggested priority areas needing more data included juvenile population dynamics (e.g., survivorship, growth rates), differentiating sexual recruits vs. juveniles vs. crusts, and survivorship of individuals after establishment of colony.

Resolution*: To assist in the recovery of these species, more scientific information is needed on both demographic variables as well as habitat-based variables including 1) survival and fecundity by age (size or stage) and frequency distribution of ages (size or stage - fragment, whole colony, sexual recruit, etc.); 2) reliance of populations on asexual vs sexual recruitment; 3) genetically distinct populations, minimum population sizes, and amount of genetic exchange between populations; 4) juvenile population dynamics (e.g., survivorship, growth rates); 5) importance of habitat variables to recruitment and adult survivorship (e.g., standing dead colonies, vertical relief, habitat condition, cross shelf position); and 6) location of "endmember" populations and those showing signs of recovery and/or sexual recruitment.*

5. Recovery

The Status WG concluded its session by discussing several factors that needed to be considered when understanding the recovery of these species including status of the species, degree of threat, likelihood of persistence, reproduction, and adequate habitat. As mentioned above, the WG agreed that both *A. palmata* and *A. cervicornis* populations have been severely decimated. Over the last year, *A. palmata* has been stable, albeit at only at 5% of its historic baseline abundance. It was emphasized that the decline in *A. cervicornis* has been more severe and continues to decline. The WG emphasized that Acroporids are one of the more sensitive reef species and given the series of disturbance events, these species are highly susceptible to future disturbances. The WG noted that the frequency and intensity of disturbances (e.g., disease, hurricanes, bleaching, human impacts) in the Caribbean have increased in recent years, with several reefs affected by repeat and/or coinciding events. In addition, with sea surface temperatures predicted to continue to warm over the next 100 years, global climate change will play a critical role in influencing the frequency and magnitude of *El Niño-La Niña* bleaching-related events and hurricanes. Threats to both species remain high and since populations are subjected to so many different stresses, any one severe disturbance event (or synergistic events) could lead to local extirpation. They suggested these species will not recovery easily from extant populations, given the current level of threats. The WG suggested that

Fig. 1. Map of the wider Caribbean showing locations where *Acropora* spp. populations were examined, and the condition of those populations.



several local populations were vulnerable to extirpation over the next 5 years in some areas (e.g., southern Belize) and over the next 10-20 years (e.g., Florida Keys) in others, especially given the probability of continued and possible increase in disturbance. On a regional scale there have been a few signs of recovery (e.g., some areas in Colombia) since the initial decline (for *A. palmata*, not *A. cervicornis*), but overall the general trend has been a general decline since the baseline 1970s, thus making both species very vulnerable to extinction. The WG emphasized that these species, given their current declined state, were highly vulnerable to both natural and anthropogenic stressors (especially synergistic effects), and had a high likelihood of localized extirpation and possible extinction, although the time frame was difficult to pinpoint. They did note that the stochastic risk of extinction was high on an ecological/historic time scale (10-100 yrs).

Although more was known on the status and degree of threat of these species, the WG emphasized that more information was needed on how to contribute to their recovery. In addition to those already mentioned above, high priorities included documenting evidence of sexual recruitment, determining what constitutes good habitat for sexual reproduction (or minimum population sizes), and identifying sources of potential reseeding reefs. The WG discussed the problems of uncertainty and lack of information, but agreed that a primary goal was to provide information that will be useful to resource managers. The WG emphasized a key factor in the recovery of these species was to focus on developing and implementing management actions that will alleviate or minimize further disturbance to these species and that will contribute to their recovery. As a next step, the WG suggested that questionnaires similar to the Status matrix they developed be distributed to gather more information. The WG acknowledged the leading and proactive step by Colombian scientists to protect Acroporids by providing recommendations to their government to add Acroporids to their country list of endangered and threatened species. Based on observations of dead vs. live coral and similar to the IUCN criteria, the Colombian scientists recommended *A. cervicornis* be listed as "critical endangered"; and *A. palmata* as "endangered". It is expected that the Colombian government will accept and implement their recommendations.

To conclude, the WG agreed *Acropora palmata* and *A. cervicornis* warranted further listing under the Endangered Species Act (ESA) and could benefit from the protection the ESA affords. They suggested the likelihood of extinction could be reduced by alleviating threats to these species and implementing strategies that promote their recovery. They further emphasized the listing of these species would provide valuable added protection to the many other species dependent on them.

Resolution: ***Acropora palmata and A. cervicornis warrant further listing under the Endangered Species Act (ESA) and could benefit from the protection the ESA affords. Acroporids are likely to qualify for listing as threatened or endangered species because of the significant reduction in their abundance and high likelihood for future population declines; the current loss of habitat and potential for future loss of range remains high; they are highly susceptible to severe population reductions due to disease and predation; there are few existing regulatory mechanisms to minimize further reductions or impacts; and both natural and anthropogenic factors are likely to affect their continued existence. The likelihood of extinction for both species could be reduced by alleviating threats and implementing strategies that promote their recovery. The listing of these species will provide valuable added protection to the many other species dependent on them.***